

**FCC Part 95
MEASUREMENT AND TEST REPORT**


For

Skyion (Shenzhen) Co., Ltd

F4, Building 3, Huihao Industrial Area, Heshuikou, Gongming Town,
Shenzhen, Guangdong, China

FCC ID: WE5DX-PRO

June 27, 2008

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Remote Control System
Test Engineer: <u>Adum Liu</u>	
Report Number: <u>SE08F-083F</u>	
Test Date: <u>June 26-27, 2008</u>	
Reviewed By: 	
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of S&E Technologies Laboratory Ltd.

TABLE OF CONTENTS

1 - GENERAL INFORMATION	3
1.1 Product Description for Equipment Under Test (EUT).....	3
1.2 Test Standards	3
1.3 Test Methodology	4
1.4 Test Facility.....	4
1.5 Test Equipment List and Details	4
2 - SYSTEM TEST CONFIGURATION	5
2.1 Justification	5
2.2 EUT Exercise Software.....	5
2.3 Special Accessories.....	5
2.4 Equipment Modifications.....	5
2.5 Basic Test Setup Block Diagram	5
3- TEST SUMMARY AND MEASUREMENT UNCERTAINTY	6
3.1 Test Summary	6
3.2 Measurement Uncertainty.....	6
4- MAXIMUM TRANSMITTER POWER.....	7
4.1 Standard Applicable.....	7
4.2 Test Procedure	7
4.3 Test Result.....	8
5- EMISSION BANDWIDTH.....	9
5.1 Standard Applicable.....	9
5.2 Test Procedure	9
5.3 Occupied Bandwidth Test Result.....	9
6- UNWANTED EMISSION.....	10
6.1 Standard Applicable.....	10
6.2 Test Procedure	10
6.3 Test Result.....	11
7- FREQUENCY STABILITY MEASUREMENT	12
7.1 Standard Applicable.....	12
7.2 Test Procedure	12
7.3 Test Result.....	13
APPENDIX A – PRODUCT LABELING.....	14
FCC ID Label Specification.....	14
Proposed Label Location on EUT	14
APPENDIX B - EUT PHOTOGRAPHS	15
EUT – Front View	15
EUT – Rear View	15
EUT – Top View.....	16
EUT – Internal View.....	16
EUT – RF Module	16
EUT – PCB View	17
APPENDIX C – TEST SETUP PHOTOGRAPHS	19

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant Name: **Skyion (Shenzhen) Co., Ltd**

Address of applicant: F4, Building 3, Huihao Industrial Area, Heshuikou, Gongming Town, Shenzhen, Guangdong, China

Manufacturer Name: **Skyion (Shenzhen) Co., Ltd**

Address of manufacturer: F4, Building 3, Huihao Industrial Area, Heshuikou, Gongming Town, Shenzhen, Guangdong, China

General Description of E.U.T

The **Skyion (Shenzhen) Co., Ltd** 's product, model number: **DX-PRO** or the "EUT" as referred to this report is a remote control system.

The technical data has been listed following:

Items	Description
EUT Description:	Remote Control System
Trade Name:	Skyion
Model No.:	DX-PRO
Rated Voltage:	DC 12V
Max. Output Power	0.0038W
Carrier Frequency:	26.995MHz, 27.045MHz, 27.095MHz, 27.145MHz, 27.195MHz, 27.255MHz
Size	180mmL x 100mmW x 235mmH
Channel Separation:	50KHz/60KHz
Type of Antenna:	Dedicated Antenna

Please refer to 3.1 of this report which carrier frequency was actually tested.
The test data gathered are from the production sample provided by the manufacturer.

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

FCC Rules and Regulations Part 95 Subpart C

The objective of the manufacturer is to demonstrate compliance with the described above standards.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Rules and Regulations Part 95 Subpart C limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

1.4 Test Facility

All tests performed at laboratory of Shenzhen Academy of Metrology and Quality Inspection.

Test site location : Longzhu Road, Nansha District, Shenzhen, Guangdong, China.

Tel : 86-755-26941617

Fax: 86-755-26941615

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No: 274801

CNAS Number (ISO/IEC17025): L0579

1.5 Test Equipment List and Details

Test Equipment	Model No.	Manufacturer	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	ESI26	Rohde&Schwarz	SB3436	01/21/2008	01/21/2009
Bilog Antenna	CBL6112B	Chase	SB3440	01/21/2008	01/21/2009
Signal generator	SMR20	Rohde&Schwarz	SB3438	01/21/2008	01/21/2009
Antenna	VUBA9117	Schwarzbeck	SB3174	01/21/2008	01/21/2009
Horn antenna	HF906	Rohde&Schwarz	SB3434	01/21/2008	01/21/2009
Horn antenna	HF906	Rohde&Schwarz	SB3435	01/21/2008	01/21/2009
3m chamber	9X6X6	Albatross projects	SB3450/01	03/21/2008	03/21/2010
Climate Chamber	Qingsheng	THS-2001	ZHS-C7C	01/25/2008	01/24/2009

Note: All testing were performed using internationally recognized standards.
All test instruments were calibrated.

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was tested according to ANSI C63.4 to represent the worst-case results during the final qualification test.

2.2 EUT Exercise Software

The EUT was operated in the engineering mode to fix the EUT continuous transmitting that was for the purpose of the measurements.

2.3 Special Accessories

There are no special accessories necessary for compliance of this product supplied by **Skyion (Shenzhen) Co., Ltd** and its respective support equipment manufacturers.

2.4 Equipment Modifications

The EUT tested was not modified by S&E Technologies.

2.5 Basic Test Setup Block Diagram

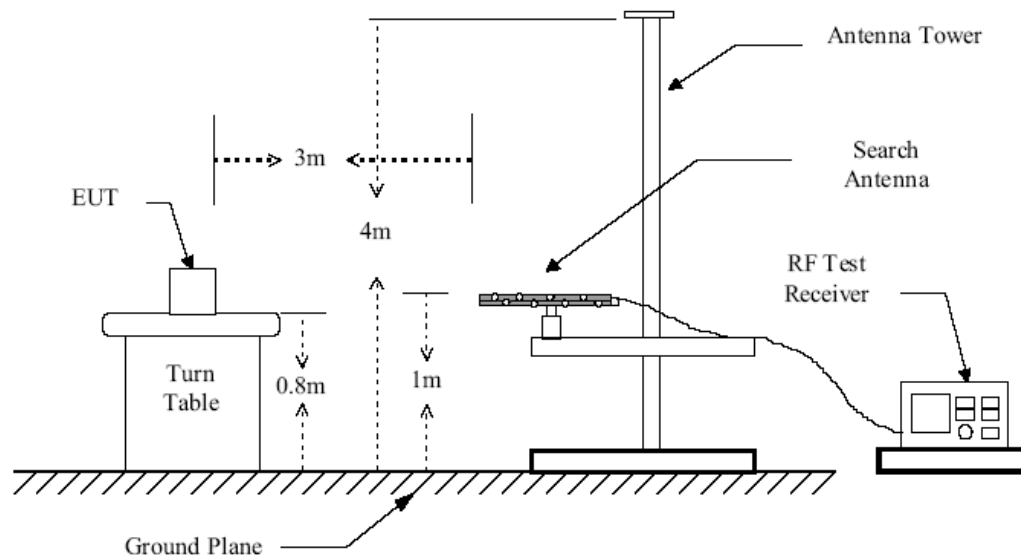


Figure 1 : Frequencies measured below 1 GHz configuration

3- Test Summary and Measurement Uncertainty

3.1 Test Summary

Since the same PCBs only use 6 type of crystals, only 27.145MHz product was completely tested in the whole report.

For the EUT described above, test items carried out Under FCC Rules and Regulations Part 95 Subpart C are listed as follow:

FCC Rules	Test Item	Requirement	Result
Section 95.639 (b)(1)	Maximum Transmitter Power	4W	Pass
Section 95.633 (b)	Emission Bandwidth	8 kHz	Pass
Section 95.635(b)(1) Section 95.635(b)(3) Section 95.635(b)(7)	Unwanted Emission	Refer to section 6.3 of this report	Pass
Section 95.623	Frequency Stability	Frequency tolerance of 0.005%	Pass

3.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4.

Radio frequency	$\pm 1 \times 10^{-7}$
Maximum frequency deviation:	
- within 300 Hz and 6 kHz of audio frequency	$\pm 5 \%$
- within 6 kHz and 25 kHz of audio frequency	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 12.75 GHz	$\pm 6 \text{ dB}$
RF level uncertainty for a given BER	$\pm 1 \text{ dB}$
Temperature	$\pm 1 ^\circ\text{C}$
Humidity	$\pm 10 \%$

4- Maximum Transmitter Power

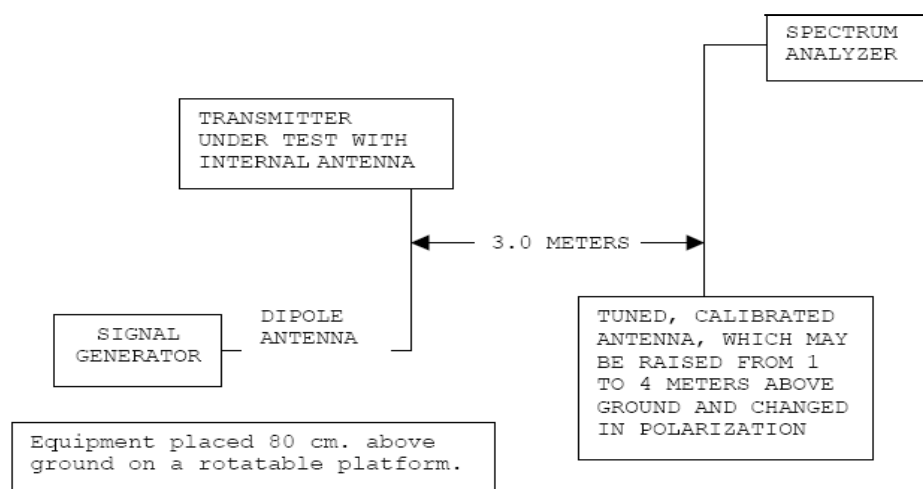
4.1 Standard Applicable

According to Part 95 section 639(b)(1), The maximum transmitter power for an R/C transmitter, under any condition of modulation, should not exceed a carrier power or peak envelop TP of : 4 W in the 26-27 MHz frequency band, except on channel frequency 27.255 MHz.

4.2 Test Procedure

The technique used to find the output power of the transmitter was the antenna substitution method. The following test procedure was followed:

1. The EUT was powered ON and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length 1m.
2. The fundamental frequency (27.145MHz) of the transmitter was maximized on the test receiver display by raising and lowering the receive antenna and by rotating the turntable. After the fundamental emission was maximized, a field strength measurement was made.
3. Steps 1 and 2 were preformed with the EUT and the receive antenna in both vertical and horizontal polarization and performed a pre-test three orthogonal planes.
4. The transmitter was then removed and replaced with a substitution antenna.
5. A signal at the fundamental frequency (27.145MHz) was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally and vertically polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2 is obtained for this set of conditions.
6. The output power into the substitution antenna was then measured.



4.3 Test Result

Temperature (°C)	22
Humidity (%RH)	50
Barometric Pressure (mbar)	980
EUT	Remote Control System
M/N	DX-PRO
Operating Mode	Continuous Transmitting

Indicated		Table	Test Antenna		Substituted		Antenna Gain Correction	Cable Loss	Absolute Level	Limit	Margin
Frequency	Corrected Reading	Angle	Height	Polar	Frequency	Level					
MHz	dBuV/m	Degree	Meter	H/V	MHz	dBm	dBd	dB	dBm	dBm	dB
27.145	102.6	154	1.20	H	27.145	3.5	2.4	0.1	5.8	36.0	-30.2
27.145	100.4	120	1.20	V	27.145	2.9	2.4	0.1	5.2	36.0	-30.8

The maximum transmitter power was 3.8 mW(5.8dBm) by using the antenna substitution method. The Unit does meet the FCC requirement.

5- Emission Bandwidth

5.1 Standard Applicable

According to FCC Part 95 section 633 (b), The R/C transmitter is allowed to transmit any appropriate non-voice emission, Which meets the emission limitations for an R/C transmitter. The authorized bandwidth for any emission type transmitted by an R/C transmitter is 8 KHz.

5.2 Test Procedure

Use the following spectrum analyzer settings:

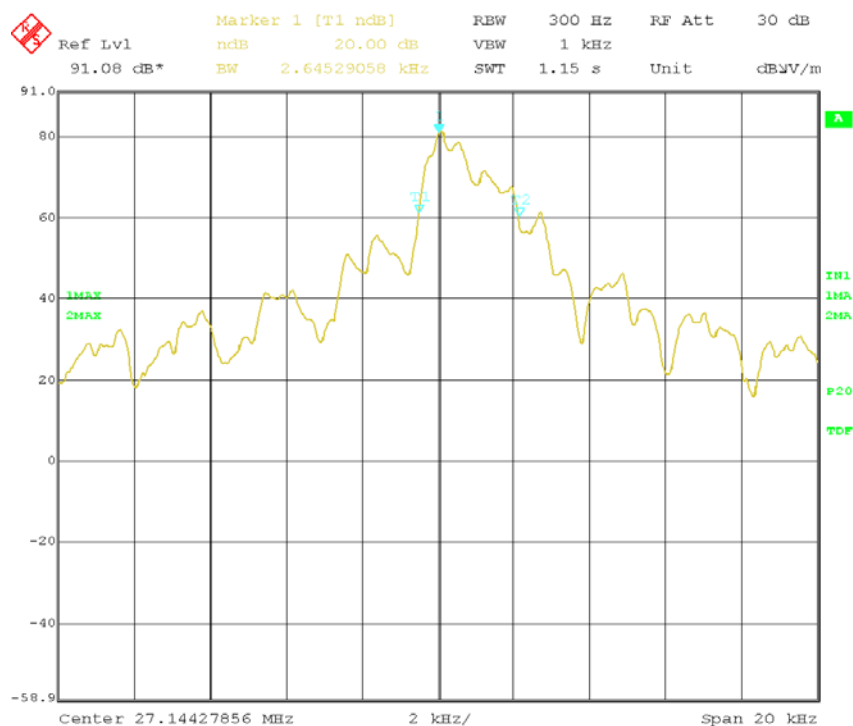
Span= 40KHz, RBW=300Hz, VBW \geq RBW, Sweep = auto
Detector function = peak, Trace = max hold

Turn on the transmitter, and set it to transmit continuously.
Bandwidth was measured and recorded.

5.3 Occupied Bandwidth Test Result

Temperature (°C)	22
Humidity (%RH)	50
Barometric Pressure (mbar)	980
EUT	Remote Control System
M/N	DX-PRO
Operating Mode	Continuous Transmitting

The following plot shows the test results.



6- Unwanted Emission

6.1 Standard Applicable

According to FCC Part 95 section 635(b)(1)(3)(7), The power of each unwanted emission should be less than follow :

- (b)(1), at least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- (b)(3), at least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- (b)(7), at least $43 \pm 10 \log_{10}(T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Calculation of FCC limit: $TP1 - [43 + 10 \log(TP)]$

Where, TP=measured transmitter power(W); TP1= Measured transmitter power(dBm)

$5.8 \text{ dBm} - [43 + 10 \log(3.8 \text{ mW}/1000)] = -13 \text{ dBm}$, the spurious emissions should not exceed -13dBm.

6.2 Test Procedure

The technique used to find the unwanted emission of the transmitter was the antenna substitution method. The following test procedure was followed:

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position closest to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter, Powered on the transmitter.
3. The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver (for testing below 30MHz, testing performed with the loop antenna and the center of the loop was positioned 1m above the ground).
4. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
5. The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
6. The maximum signal level detected by the measuring receiver shall be noted until 10th harmonic.
7. The transmitter shall be replaced by a substitution antenna,
8. The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
9. The substitution antenna shall be connected to a calibrated signal generator.
10. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
11. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received (For testing below 30MHz, testing performed with the loop antenna and the center of the loop was positioned 1m above the ground)..
12. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
13. The input level to the substitution antenna shall be recorded as power level, corrected for any change of input attenuator setting of the measuring receiver.

14. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

6.3 Test Result

Temperature (°C)	22
Humidity (%RH)	50
Barometric Pressure (mbar)	980
EUT	Remote Control System
M/N	DX-PRO
Operating Mode	Continuous Transmitting

Vertical

Frequency [MHz]	RF Power at signal source [dBm]	Antenna Polarization	Correction Factor [dBm]	Result ERP [dBm]	Spec Limit [dBm]	Margin [dB]
54.288	-50.2	V	-10.4	-60.6	-13	-47.6
81.432	-31.5	V	-10.2	-41.7	-13	-28.7
108.578	-52.4	V	-9.9	-62.3	-13	-49.3
135.723	-47.9	V	-10.7	-58.6	-13	-45.6
162.869	-49.2	V	-10.2	-59.4	-13	-46.4
Note:						
1. Correction factor includes cable loss, coupling factor and attenuator loss.						
2. The other frequency is more than 50dB below limit.						

Horizontal

Frequency [MHz]	RF Power at signal source [dBm]	Antenna Polarization	Correction Factor [dBm]	Result ERP [dBm]	Spec Limit [dBm]	Margin [dB]
54.279	-49.8	H	-10.4	-60.2	-13	-47.2
81.432	-31.3	H	-10.2	-41.5	-13	-28.5
108.578	-50.2	H	-9.9	-61.1	-13	-48.1
135.702	-47.7	H	-10.7	-58.4	-13	-45.4
162.899	-49.0	H	-10.2	-59.2	-13	-46.2
190.014	-53.3	H	-9.5	-62.8	-13	-49.8
Note:						
1. Correction factor includes cable loss, coupling factor and attenuator loss.						
2. The other frequency is more than 50dB below limit.						

The unit does meet the FCC requirement.

7- FREQUENCY STABILITY MEASUREMENT

7.1 Standard Applicable

According to FCC Part 95 section 623(b):

Each R/C transmitter that transmits in the 26–27 MHz frequency band with a mean TP of 2.5 W or less and that is used solely by the operator to turn on and/or off a device at a remote location, other than a device used solely to attract attention, must be maintained within a frequency tolerance of 0.01%. All other R/C transmitters that transmit in the 26–27 MHz frequency band must be maintained within a frequency tolerance of 0.005%. Except as noted in paragraph (c) of this section, R/C transmitters capable of operation in the 72–76 MHz band must be maintained within a frequency tolerance of 0.005%.

7.2 Test Procedure

According to ANSI C63.4, the frequency stability measurement shall be made as follow:

- (a) at 10 degree interval of temperatures between –30°C to +50°C at the manufacture's rated supply voltage and
- (b) at +20 °C temperature and $\pm 15\%$ supply voltage variations.

Note, for handheld equipment that is only capable of operating from internal batteries, reduce the primary supply voltage to the battery operating end point. The manufacturer should specify the battery operating endpoint voltage of the equipment.

7.3 Test Result

Temperature (°C)	22
Humidity (%RH)	50
Barometric Pressure (mbar)	980
EUT	Remote Control System
M/N	DX-PRO
Operating Mode	Continuous Transmitting

Frequency Stability vs. Temperature

Assigned Frequency(MHz)	Temperature.(°C)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
27.145	-30	27.14534	0.34	1.35
	-20	27.14526	0.26	1.35
	-10	27.14519	0.19	1.35
	0	27.14563	0.63	1.35
	+10	27.14558	0.58	1.35
	+20	27.14543	0.43	1.35
	+30	27.14536	0.36	1.35
	+40	27.14533	0.33	1.35
	+50	27.14529	0.29	1.35
The unit does meet the FCC requirement.				

Frequency Stability vs. Supply Voltage

Nominal voltage : 12V

Temperature : 20 °C

Assigned Frequency(MHz)	Voltage (V)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
27.145	12.0	27.14508	0.08	1.35
	11.0	27.14556	0.56	1.35
	10.0	27.14537	0.37	1.35
	9.0	27.14549	0.49	1.35
	8.0	27.14546	0.46	1.35
	7.0	Stop transmitting		
Remark: The applicant declared the endpoint voltage 8.0V DC. It will give the operation guidance to the customer in user manual. The unit does meet the FCC requirements.				

APPENDIX A – PRODUCT LABELING

FCC ID Label Specification

Specification: Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing and shall be affixed at a conspicuous location on the EUT or silk-screened onto the EUT.

FCC ID: WE5DX-PRO

Proposed Label Location on EUT



APPENDIX B - EUT PHOTOGRAPHS

EUT – Front View



EUT – Rear View



EUT – Top View



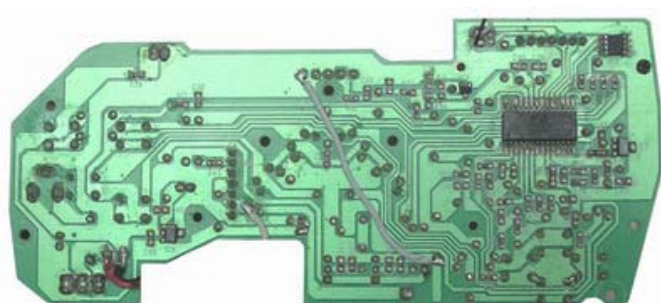
EUT – Internal View

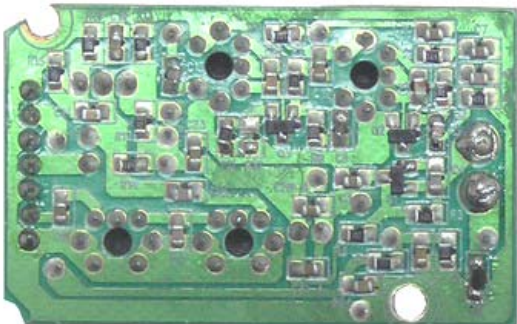


EUT – RF Module



EUT – PCB View





APPENDIX C – TEST SETUP PHOTOGRAPHS

